CEAB Update

Definition of Engineering Design and IEA Framework

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GACIP Summit Plus

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New definition of Engineering Design

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New definition of “engineering design”

Engineering design is a process of making informed decisions to creatively devise products, systems, components, or processes to meet specified goals based on engineering analysis and judgement. The process is often characterized as complex, open-ended, iterative, and multidisciplinary. Solutions incorporate natural sciences, mathematics, and engineering science, using systematic and current best practices to satisfy defined objectives within identified requirements, criteria and constraints. Constraints to be considered may include (but are not limited to): health and safety, sustainability, environmental, ethical, security, economic, aesthetics and human factors, feasibility and compliance with regulatory aspects, along with universal design issues such as societal, cultural and diversification facets.

New interpretive statement on “engineering design”

Touches on:

- What engineering design is not
- What engineering design includes
- The various levels of engineering design (i.e. introductory, developmental, and complex)
- Illustrative examples

2022 Accreditation Criteria and Procedures

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Revision history

LEGEND: ~~Deleted~~ / Added text

Version	Criterion/Appendix	Description of changes
2022	Criterion 3.1 - Graduate attribute #4: Design	Design: ~~An ability to design solutions for complex, open-ended engineering problems and to design systems, components or processes that meet specified needs with appropriate attention to health and safety risks, applicable standards, and economic, environmental, cultural and societal considerations~~. The ability to perform engineering design. Engineering design is a process of making informed decisions to creatively devise products, systems, components, or processes to meet specified goals based on engineering analysis and judgement. The process is often characterized as complex, open-ended, iterative, and multidisciplinary. Solutions incorporate natural sciences, mathematics, and engineering science, using systematic and current best practices to satisfy defined objectives within identified requirements, criteria and constraints. Constraints to be considered may include (but are not limited to): health and safety, sustainability, environmental, ethical, security, economic, aesthetics and human factors, feasibility and compliance with regulatory aspects, along with universal design issues such as societal, cultural and diversification facets.
	Criterion 3.4.4.5	A minimum of 225 AU in engineering design is required. ~~Engineering design integrates mathematics, natural sciences, engineering sciences, and complementary studies in order to develop elements, systems, and processes to meet specific needs. It is a creative, iterative, and open-ended process, subject to constraints which may be governed by standards or legislation to varying degrees depending upon the discipline. These constraints may also relate to economic, health, safety, environmental, societal or other interdisciplinary factors~~. Engineering design is a process of making informed decisions to creatively devise products, systems, components, or processes to meet specified goals based on engineering analysis and judgement. The process is often characterized as complex, open-ended, iterative, and multidisciplinary. Solutions incorporate natural sciences, mathematics, and engineering science, using systematic and current best practices to satisfy defined objectives within identified requirements, criteria and constraints. Constraints to be considered may include (but are not limited to): health and safety, sustainability, environmental, ethical, security, economic, aesthetics and human factors, feasibility and compliance with regulatory aspects, along with universal design issues such as societal, cultural and diversification facets.
	New appendix	Appendix 17 – Interpretive statement on the definition of engineering design
2021	Appendix 3 – Interpretive statement on licensure expectations and requirements	~~In order to ensure that~~ Engineering science, engineering design, natural science, mathematics and complementary studies curriculum content should be ~~are~~ readily and easily identifiable through learning outcomes, learning activities and assessments attributable to each category in each course where they appear. ~~, each course in an engineering program should be described using a maximum of three curriculum categories (ES, ED, NS, Math, CS) with no single category constituting less than 8 AUs or 25% of the total AU for a particular course.~~ ~~9. It is up to the institution offering the program to justify the unique aspects of any course that deviates from clause 9.~~

Impact of the new IEA Graduate Attributes on accreditation criteria

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Background

- Engineers Canada is a signatory of the **Washington Accord**
- *International Engineering Alliance (IEA) Graduate Attribute and Professional Competency Framework* is a foundational document for the Accord
  - Signatories must demonstrate 'substantial equivalency' to the IEA Framework
  - **CEAB Graduate Attributes** must be substantially equivalent to those of the IEA
- 2019 working group with members from the IEA, the World Federation of Engineering Organizations (WFEO), and UNESCO updated the framework.
  - Professional competencies now include digital literacy, data analysis
  - References United Nations' Sustainable Development Goals (UNSDGs)
  - New emphasis on cultural competence, inclusivity, and continuing professional development

2023 CEAB Workplan

- Study the new Framework and map current CEAB Graduate Attributes to new framework
- Gap analysis and implementation plan
- Report on-going progress to the IEA

Example of 2021 IEA Framework revision:

2013 IEA Framework		2021 IEA Revision	CEAB Graduate Attribute
The Engineer and Society	Apply reasoning informed by contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to professional engineering practice and solutions to complex engineering problems.	**The Engineer and the World:** When solving complex engineering problems, analyze and evaluate sustainable development impacts* to: society, the economy, sustainability, health and safety, legal frameworks, and the environment. *Represented by the 17 UN Sustainable Development Goals (UN-SDG)	**GA 9: Impact of engineering on society and the environment:** An ability to analyze societal and environmental aspects of engineering activities. Such ability includes an understanding of the interactions that engineering has with the economic, health, safety, legal, and cultural aspects of society, the uncertainties in the prediction of such interactions; and the concepts of sustainable design and development and environmental stewardship.
Environment and Sustainability	Understand and evaluate the sustainability and impact of professional engineering work in the solution of complex engineering problems in societal and environmental contexts.		

Discussion and thank you!

Follow-up questions? accreditation@engineerscanada.ca

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